Department of Ecology

Stormwater

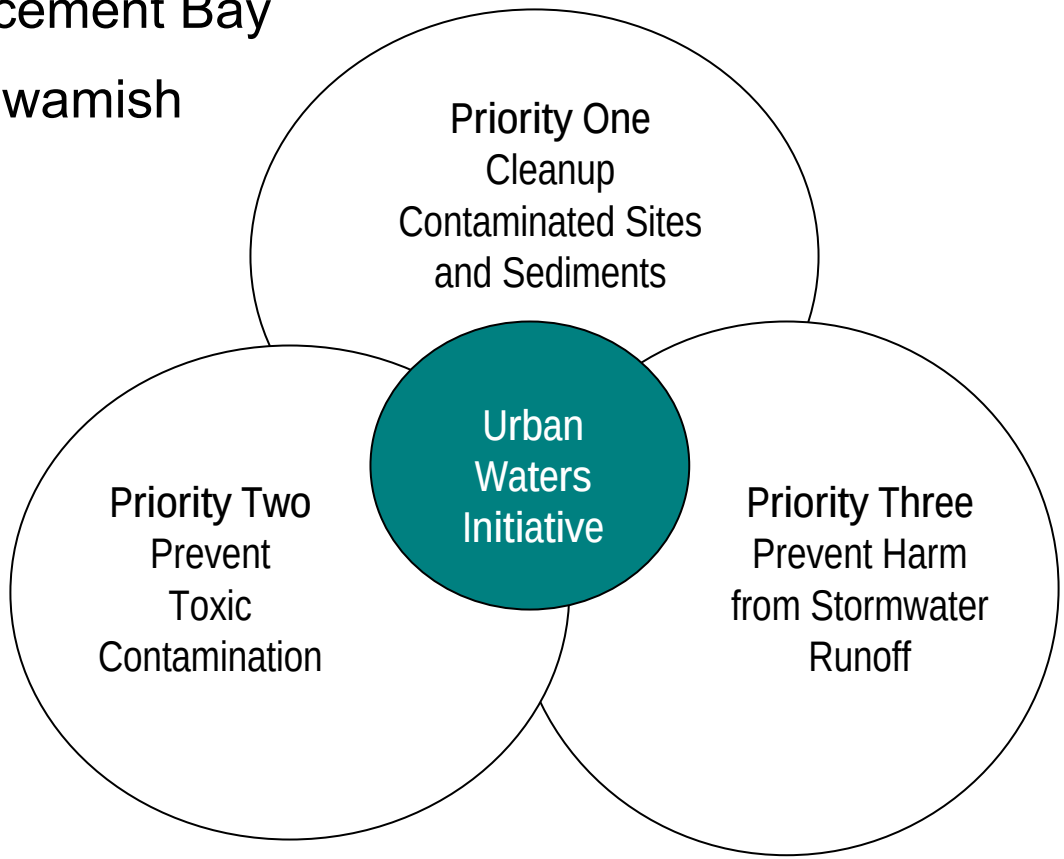
March 20, 2007

Stormwater – Ecology Urban Waters Initiative

Integrating three priorities from the Puget Sound Conservation Plan

Commencement Bay

Lower Duwamish



Stormwater – Ecology Urban Waters Initiative

Commencement Bay and the Lower Duwamish are contaminated with hazardous chemicals from industrial sources, contaminated sites, stormwater, municipal wastewater, and businesses that use hazardous substances or generate hazardous wastes.

The Urban Waters Initiative

→Reduce toxic chemical pollution from stormwater runoff and other sources

- So that -- sediments sites that have been cleaned up or are in the process of being cleaned up are not re-contaminated

Our Approach

We are changing our traditional "stove-pipe" approach to reducing the sources of contaminants to a "triage" approach by cross-training our water quality, hazardous waste and cleanup employees to:

- Identify sources of contamination
- Inspect businesses more often
- Make sure businesses obtain and comply with permits they need

Intermediate Outcomes in 2007-2009 (pending new funds from 2007 session)

Eight fold increase in the number of businesses that we visit in Lower Duwamish
250% increase in the number of businesses that we visit in Commencement Bay
150% increase in the percent of businesses that are required to obtain a stormwater permit

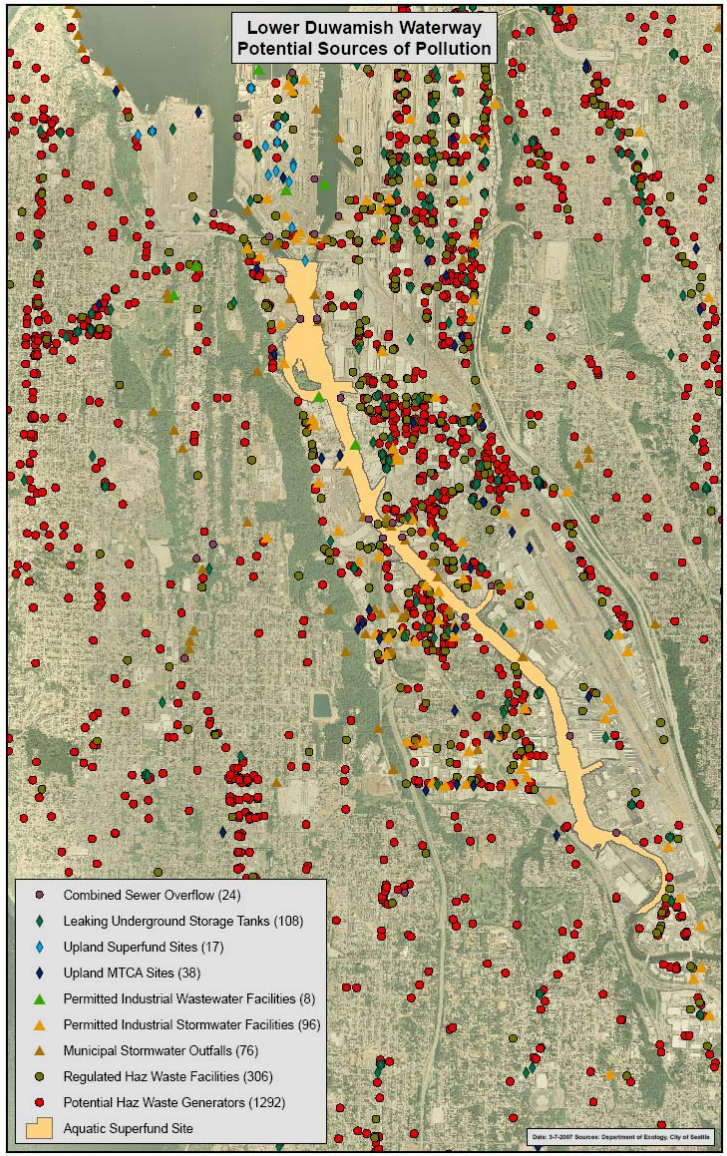
Longer Term Outcome

We will be monitoring the marine sediments and water quality to determine the effectiveness of our pollution source control strategies

Lower Duwamish Waterway

Analysis

- Approximately 80-95% of the Lower Duwamish Basin surface is impervious
- Stormwater runoff is a primary pathway for toxic chemical contamination of sediments
- The **yellow area** is the Duwamish River – a federal Superfund Cleanup site for sediments contaminated with toxic chemicals
- The **red dots** represent facilities or businesses that are potential contributors to toxic stormwater pollution - these are facilities that are currently not regulated
- All the other symbols are facilities or businesses that we currently regulate
- A large percentage of the potential facilities contributing to stormwater pollution are not regulated or permitted
- Our Urban Waters Initiative will help us “get in the front door” of these facilities to assess potential regulatory assistance and permitting



Lower Duwamish Action Plan

Lower Duwamish	2005 - 07 Actions	Planned 2007 – 09 Actions	Lead
Source Control in cooperation with City of Seattle, King County the Port of Seattle and the City of Tukwila	Of the potential universe of >1,000 facilities: • 50 Site Visits – technical assistance, pollution prevention or compliance. • 96 (of 96) Site Visits – permitted industrial stormwater. • Develop source control tracking system. • Complete 2 source control action plans. • Negotiate Memorandum of Agreement between EPA and Ecology for site cleanup and source control to prevent recontamination.	With current resources: • 50 Site Visits – technical assistance, pollution prevention or compliance. • 40 Site Visits - permitted industrial stormwater. • Complete 1-2 site specific source control plans each year. o Identifies potential pollution sources o Directs follow-up to appropriate agency Additional work in a “triage” approach between Ecology programs & local governments with new funding: • 800 Site Visits – Combined authority source inspection. Sites prioritized for follow-up as needed. Sites needing a stormwater permit would be asked to apply. • Develop performance targets. • Build capacity at the local government to help prevent toxics from getting into Puget Sound.	Ecology: Fitzpatrick, Alexander & Sellick
Cleanup	• Coordinate with EPA on sediment and EPA-lead upland cleanups. EPA lead on remedial investigation / feasibility studies and cleanup for sediments. Ecology is lead on investigating contaminate sources. • Coordination with EPA on investigation & cleanup.	• Investigate sources of sediment contamination	Ecology: Fitzpatrick, Alexander & Sellick
Monitoring	• Industrial stormwater facilities under permits monitor zinc, oil & grease, turbidity & pH in their stormwater. • Conduct Industrial Stormwater Monitoring Study (Impact on sediments).	• Collect baseline data for measuring the effectiveness of source control strategies and site-specific source control action plans. • Industrial stormwater facilities under permits will monitor zinc, lead, copper, oil & grease, turbidity & pH in their stormwater.	Ecology: Cusimano Winters Nord

Commencement Bay Action Plan

Commencement Bay	2005 – 07 Actions	Planned 2007 – 09 Actions	Who / When
Source Control in coordination with the City of Tacoma and Pierce County	Of the potential universe of >1,016 facilities: • 165 Site Visits – technical assistance, pollution prevention or compliance • 123 Site Visits - permitted industrial stormwater • Phthalate Work Group to address recontamination issues beginning with Thea Foss. • Adapt Lower Duwamish Waterway source tracking system to include other areas. Phase 1 complete by summer. • Complete current analysis of sediment sites around Puget Sound.	With current resources: • 135 Site Visits – technical assistance, pollution prevention or compliance. • 50 Site Visits - permitted industrial stormwater. Additional work in a "triage" approach between Ecology programs & local governments with new funding: • 250 Site visits – Combined authority source investigation. Sites prioritized for follow-up as needed. Sites needing a stormwater permit would be asked to apply. • Build capacity at the local government to help prevent toxics form getting into Puget Sound.	Ecology: Susewind, Seiler & Lawson
Cleanup	• Coordinate with EPA on cleanups. Agencies are leading cleanups on separate sites. • With current financial ability, we can move towards contaminated site cleanup in a more determined way rather than opportunistic way.	• Three programs at Ecology are integrating work priorities more effectively in the Lower Duwamish Waterway and Commencement Bay areas. • Develop new models of cleaning up sites where the traditional model hasn't been timely or effective.	Ecology: Susewind, Seiler & Lawson
Monitoring	Industrial stormwater facilities under permits monitor zinc, oil & grease, turbidity & pH in their stormwater.	• Collect baseline data for measuring the effect of source control activities on the reduction of toxic contaminants that are contaminating or threatening to re-contaminate Commencement Bay. • Industrial stormwater facilities under permits will monitor zinc, lead, copper, oil & grease, turbidity & pH in their stormwater.	Ecology: Cusimano Winters

BACKGROUND SLIDES

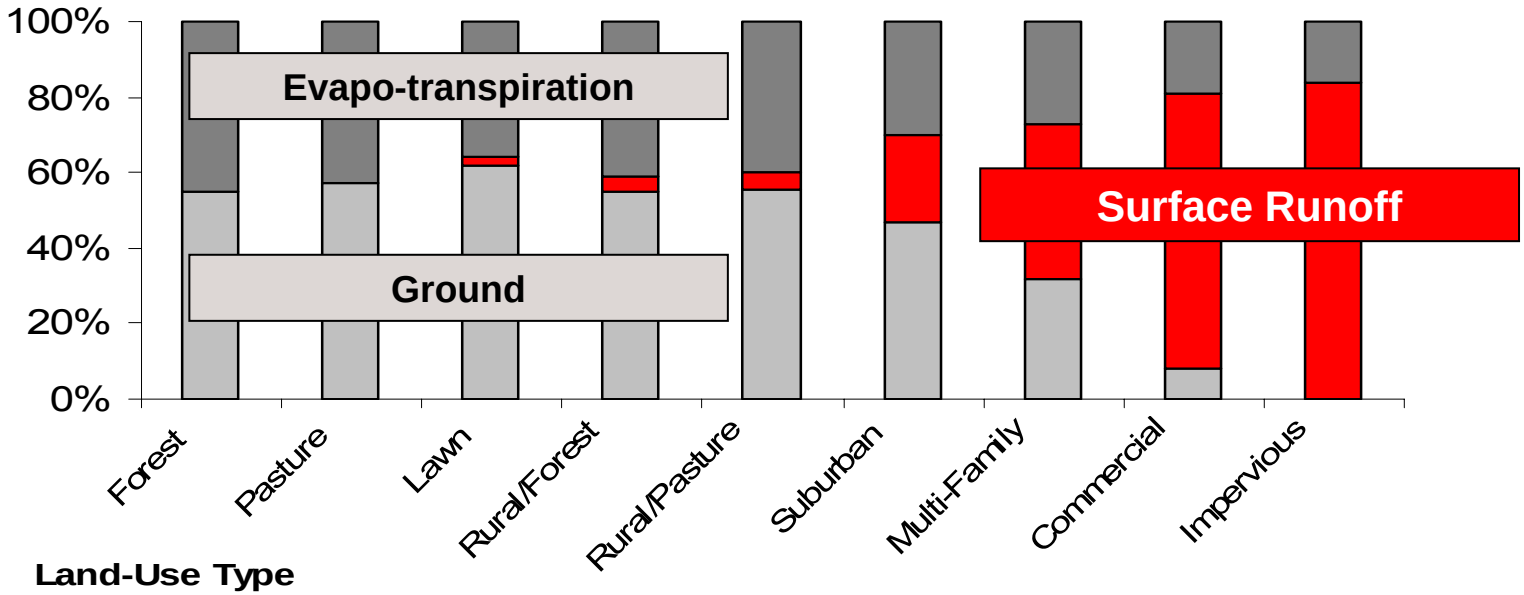
Stormwater: Background

Gaps and Challenges

- Stormwater programs, monitoring, and infrastructure are underfunded.
- Programs mainly address new development, not existing impervious surfaces.
- Combined Sewer Overflows – planned timeline for corrections is 20 years.
- Current emphasis is on inspecting industrial facilities under permit, which are a fraction of the number that potentially need permit coverage.
- Paucity of data on toxic loading from stormwater to Puget Sound.
- Paucity of data on toxics from air deposition to impervious surfaces.
- Information management systems need to be compatible to share data.
- Cars contribute numerous contaminants including oils, metals, and phthalates.
- Atmospheric deposition. This is an emerging area of study. The few studies done are showing the air deposition pathway as a significant source to sediments and water. The Duwamish is collecting information and samples to try and define how big the problem is locally. If the Tacoma smelter plume affects the Duwamish, then it stands to reason that other air sources at least as far away as Tacoma could also have an effect.
- CSO's- Even when domestic and industrial discharges are plumb into the sanitary sewer system, during a moderate to heavy rain event most that waste is discharged into the waterways.
- Leaking underground storage tanks, sumps, and other sources cause groundwater pollution. Sometimes this includes free 'product' – gasoline, diesel, fuel oil, dry cleaning fluids, and solvents.
- Virtually all storm water systems leak; if the pipes, manholes, and catch basins are deep enough, polluted groundwater flows into them.
    - This condition is common in the developed areas near Puget Sound due to shallow groundwater in near shore areas.

Stormwater: Background

Where does all the rain go?



Pollution Impacts:

- Heavy metals
- Petroleum
- Organics
- Sediment
- Pathogens
- Nutrients

Altered Flow Impacts:

Wet months:

- Degraded stream channels & habitat
- Degraded wetlands
- Flooding and property damage

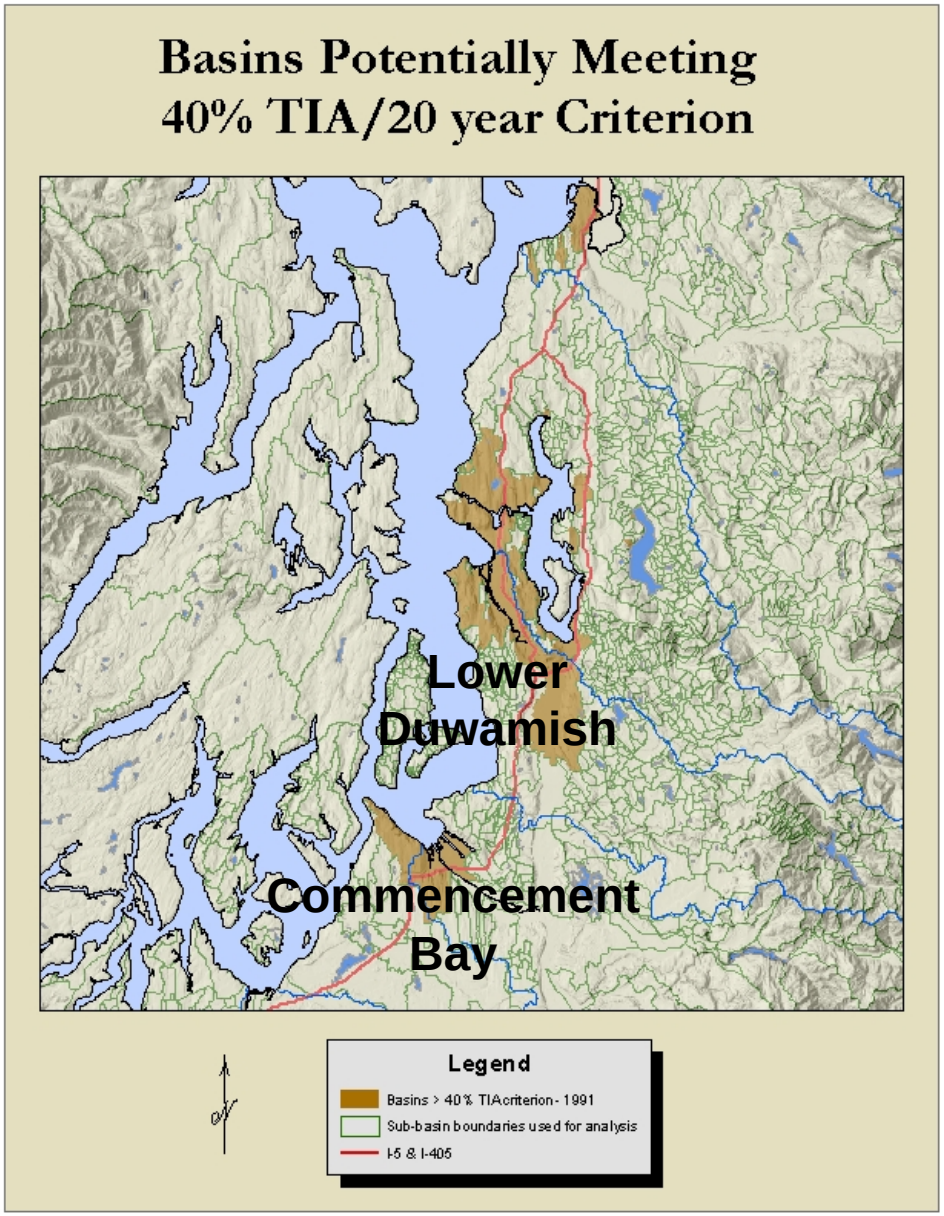
Dry Months

- Low stream flows
- Lost recharge of wetlands & aquifers

Overall Stormwater Pollution Action Plan

2007- 2009 Puget Sound Conservation and Recovery Plan and Dept. of Ecology

Strategy	Actions
Develop effective pollution source control strategies.	Ecology is focusing on two urban bays in 2007-2009 (plus Spokane); Ecology and local governments will identify, inspect & provide technical assistance to businesses to help them eliminate / reduce discharges of pollutants and the use of toxic substances.
Improve management of industrial, construction and municipal stormwater	Ecology will • Provide technical assistance to help municipal permittees comply with permits. • Re-issue the general industrial stormwater permit in fall, 2007. • Inspect permitted industrial and construction stormwater sites once every five years.
Inform local land use decisions	Through pilot watershed characterization projects, Ecology and Whatcom County will demonstrate alternative land use decisions for controlling stormwater runoff.
Increase use of Low-Impact Development	Puget Sound Action Team will provide guidance, Ecology provides grants, and EPA will provide monitoring for local government and State Park LID projects, depending on money.
Manage / prevent runoff from state highways	WA State Dept. of Transportation will manage stormwater runoff in compliance with permit to be issued by Ecology in fall, 2007.
Reduce the number and volume of combined sewer overflow events	Ecology tracks progress of local government CSO control programs; local governments make improvements to systems over a 20-year period.
Find out what impacts of stormwater are through effective monitoring program	If funded, Ecology will initiate a comprehensive monitoring program to better understand stormwater impacts on Puget Sound and effectiveness of management practices.
Increase small acreage landowner assistance and incentives	Conservation districts provide technical assistance and small acreage landowners implement best management practices to reduce contamination and volume of stormwater runoff.
Educate and involve the public	WSU Coop. Ext., Sea Grant, Puget Sound entity, Ecology, Health and local and tribal governments will provide education on preventing stormwater pollution to citizens.
Reduce stormwater runoff from forest practices and other land use practices	Ecology issues permits for and inspects construction stormwater sites. Ecology and DNR help ensure forest roads are in compliance with state and federal standards.
Reduce hydrologic flow from storm events	Ecology will track progress on local government efforts to reduce stormwater flow to surface waters under municipal stormwater permit, 2007-2011.



Between 1991-2001 impervious surface cover increased basin wide by over 10%

Some sub-basins experienced much higher increases in impervious surface cover.

Lower Duwamish = 80-95%

Commencement Bay = 50 - 60%

This is important to know

During storm events, impervious land rapidly moves high volumes of water and pollutants to rivers and marine water. This degrades water quality, contaminates sediments, harms species, and closes shellfish growing areas.

Land conversions & construction

Existing discharges

Sources

Residences

Commercial

Industries

Highways

Onsite Sewage Systems

Animal keeping

Combined Sewer Overflows

Air Deposition

Pollutants

Altered flows

Heavy metals

Petroleum products

Other organic toxicants

Sediment

Pathogens

Nutrients

Stormwater: What are the impacts?

Scientist studying English sole.
Photo by Steve Quinnell

- Shellfish areas restricted
- Salmon behavior altered
- English sole liver lesions
- Sediment contaminated or recontaminated
- Dissolved oxygen lowered
- Public access restricted

What are the impacts? Altered flows

Wet months:

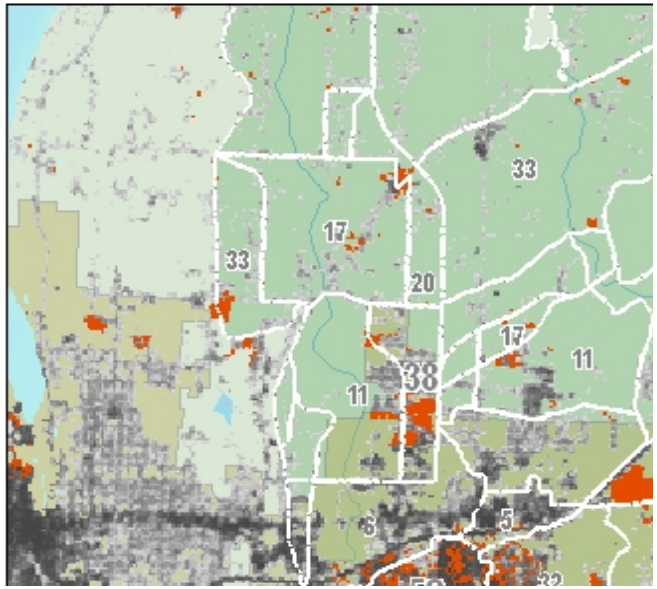
- Degraded stream channels and habitat
- Degraded wetlands
- Flooding & property damage

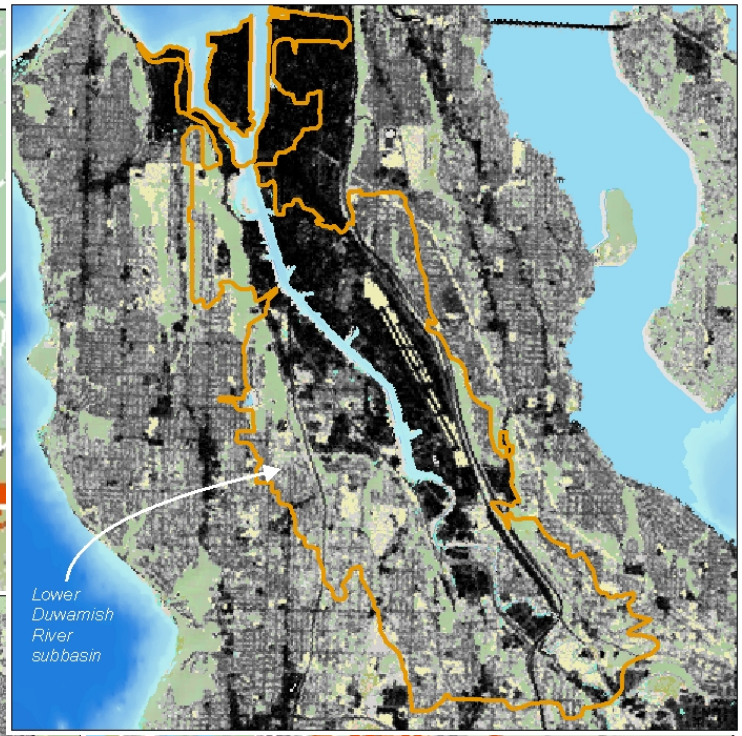
Dry months:

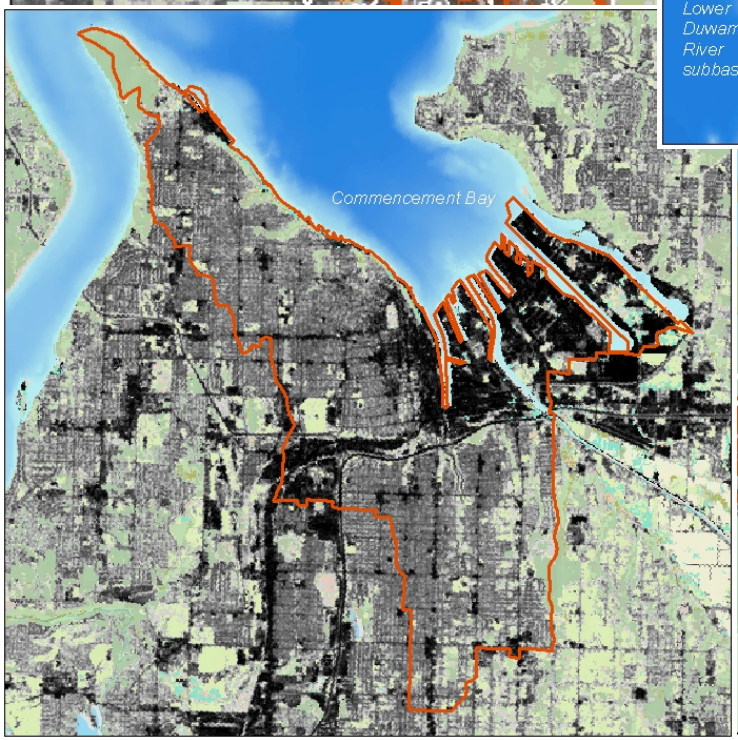
- Low stream flows
- Lost recharge of wetlands & aquifers

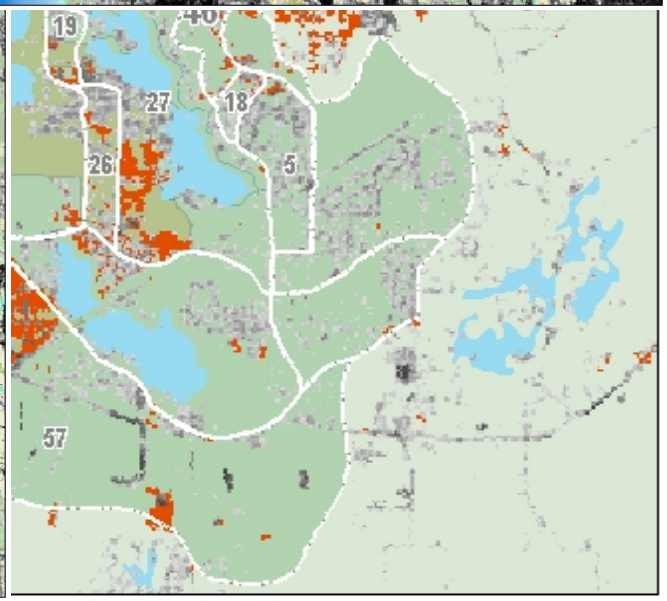
Courtesy of Hans Hunger, Pierce County

Indicator: Stormwater Trends in Impervious Surface Cover









Between 1991-2001 impervious surface cover increased basin wide by over 10%

Some sub-basins experienced much higher increases in impervious surface cover

Commencement Bay and the Lower Duwamish are two sub-basins that have 40% or more of their total area covered by impervious surfaces

During storm events, impervious land rapidly moves high volumes of water and pollutants to rivers and marine water. This degrades water quality, contaminates sediments, harms species, and closes shellfish growing areas

Data sources: Ecology; PSAT